FIG. 1

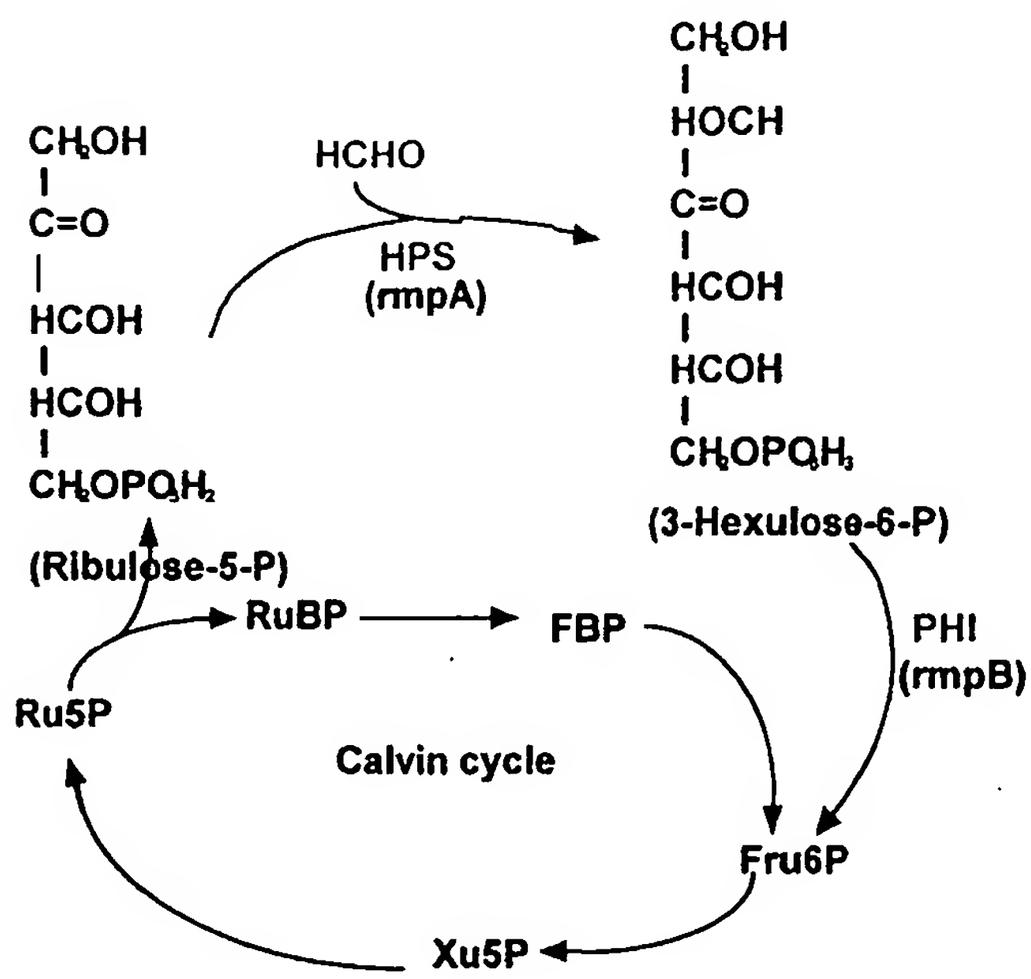

CH2OH
C=O
HCOH
CH2OPO3H2
(Ribulose-5-P)
HCHO
HPS
(rmpA)
CH2OH
HOCH
C=O
HCOH
CH2OPO3H2
(3-Hexulose-6-P)
RuBP
FBP
PHI
(rmpB)
Ru5P
Calvin cycle
Fru6P
Xu5P

FIG. 2

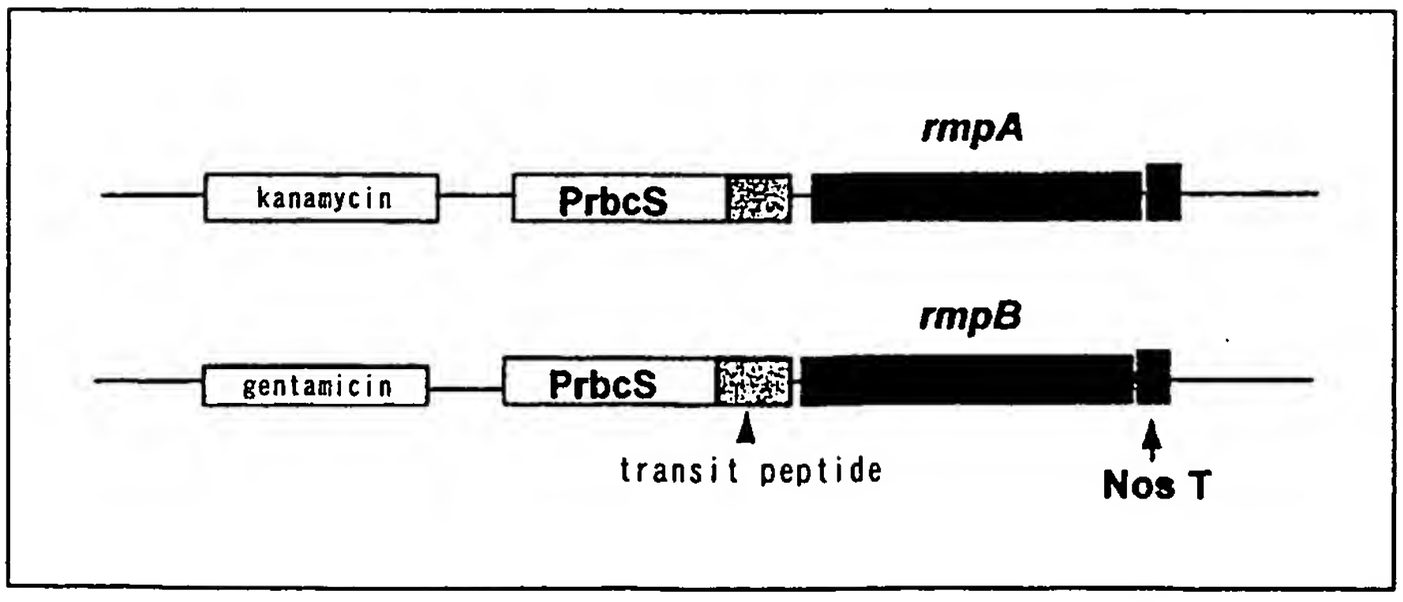

rmpA
kanamycin
PrbcS
rmpB
gentamicin
PrbcS
transit peptide
Nos T

FIG. 3

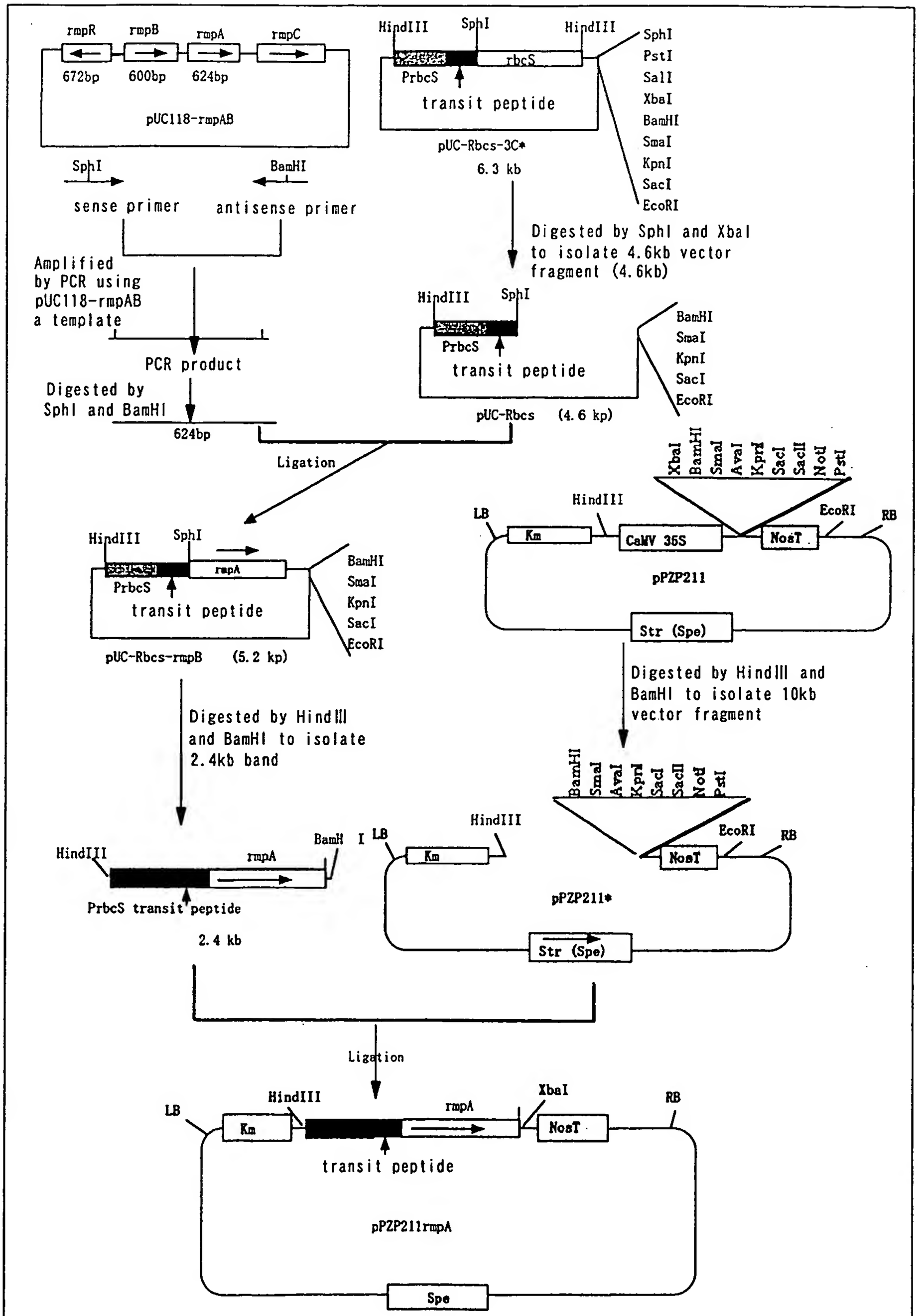

rmpR
rmpB
rmpA
rmpC
672bp
600bp
624bp
pUC118-rmpAB
SphI
BamHI
sense primer
antisense primer
Amplified by PCR using pUC118-rmpAB a template
PCR product
Digested by SphI and BamHI
624bp
HindIII
SphI
PrbcS
transit peptide
rmpA
BamHI
SmaI
KpnI
SacI
EcoRI
pUC-Rbcs-rmpB (5.2 kp)
Digested by HindIII and BamHI to isolate 2.4kb band
HindIII
BamH I
rmpA
PrbcS transit peptide
2.4 kb
HindIII
SphI
rbcS
transit peptide
pUC-Rbcs-3C*
6.3 kb
SphI
PstI
SalI
XbaI
BamHI
SmaI
KpnI
SacI
EcoRI
Digested by SphI and XbaI to isolate 4.6kb vector fragment (4.6kb)
HindIII
SphI
PrbcS
transit peptide
BamHI
SmaI
KpnI
SacI
EcoRI
pUC-Rbcs (4.6 kp)
Ligation
XbaI
BamHI
SmaI
AvaI
KpnI
SacI
SacII
NotI
PstI
HindIII
LB
Km
CaMV 35S
NosT
EcoRI
RB
pPZP211
Str (Spe)
Digested by HindIII and BamHI to isolate 10kb vector fragment
BamHI
SmaI
AvaI
KpnI
SacI
SacII
NotI
PstI
HindIII
LB
Km
EcoRI
NosT
RB
pPZP211*
Str (Spe)
Ligation
LB
HindIII
rmpA
XbaI
RB
Km
NosT
transit peptide
pPZP211rmpA
Spe

FIG. 4

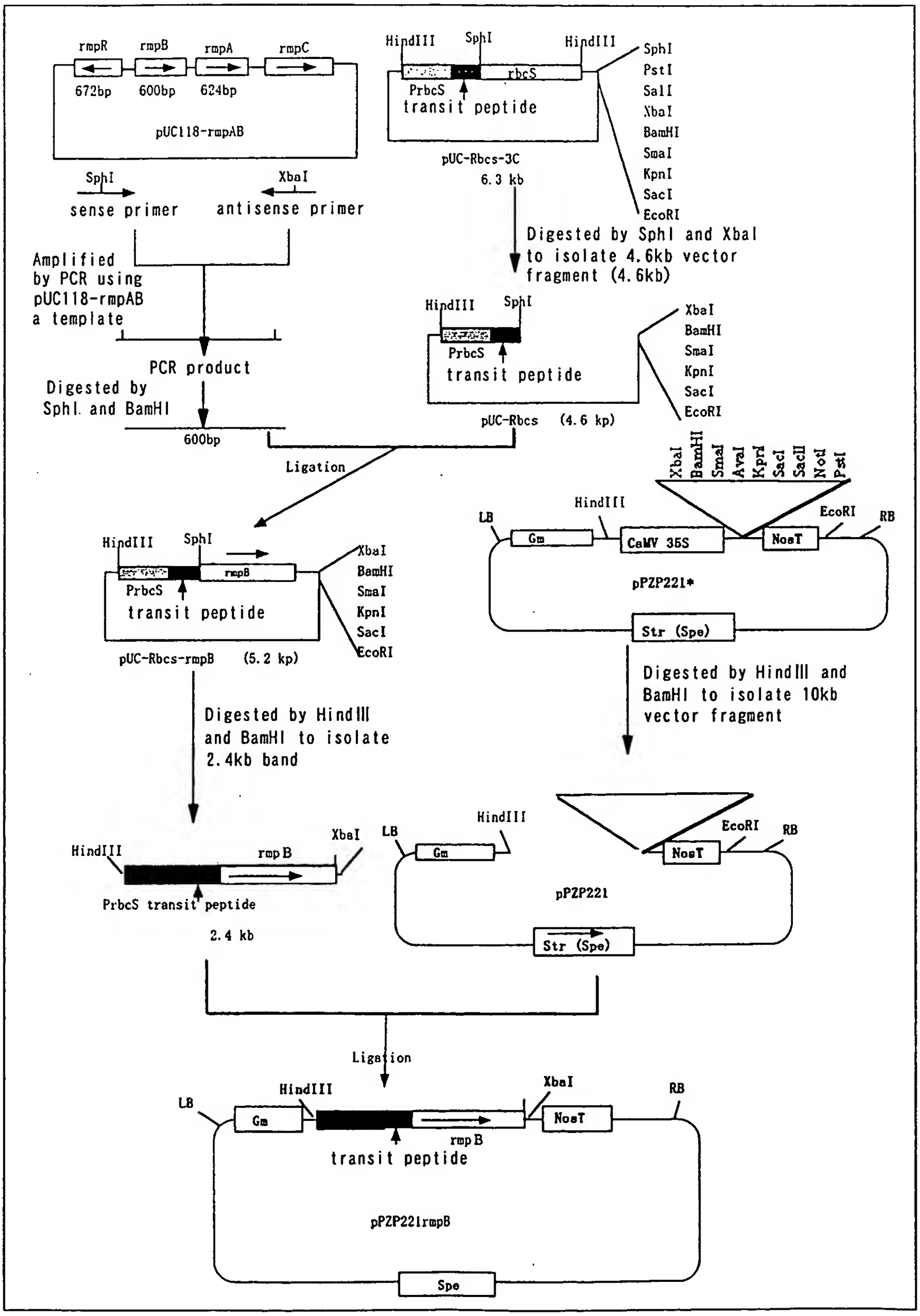

rmpR
rmpB
rmpA
rmpC
672bp
600bp
624bp
pUC118-rmpAB
SphI
XbaI
sense primer
antisense primer
Amplified by PCR using pUC118-rmpAB a template
PCR product
Digested by SphI and BamHI
600bp
HindIII
SphI
PrbcS
transit peptide
rbcS
pUC-Rbcs-3C
6.3 kb
SphI
PstI
SalI
XbaI
BamHI
SmaI
KpnI
SacI
EcoRI
Digested by SphI and XbaI to isolate 4.6kb vector fragment (4.6kb)
pUC-Rbcs (4.6 kp)
Ligation
rmpB
pUC-Rbcs-rmpB (5.2 kp)
Digested by HindIII and BamHI to isolate 2.4kb band
HindIII
rmpB
XbaI
2.4 kb
PrbcS transit peptide
XbaI
BamHI
SmaI
AvaI
KpnI
SacI
SacII
NotI
PstI
LB
Gm
CaMV 35S
NosT
RB
EcoRI
pPZP221*
Str (Spe)
Digested by HindIII and BamHI to isolate 10kb vector fragment
pPZP221
Ligation
pPZP221rmpB
Spe

FIG. 5

Primer for amplification of rmpA gene by PCR

rmpA-sense (2506-2530) GCATGCAAGGGGTAACCATGACG

rmpA-antisense (3150-3129) TCTAGAGGATCAGGCGATCGC

Sequence of transit peptide **(accession:X05986)**

```
                                                                    atg
301 gcttcttcag taatgtcctc agcagctgtt gccacccgcg gcaatggtgc acaagctagc
361 atggttgcac ccttcactgg actcaagtcc accgcttctt tccctgtttc aaggaagcaa
421 aaccttgaca ttacctccat tgctagcaac ggtggaagag tcagttgc
```

Sequence of rmpA gene **(accession: AB034913)**

```
                                                                    atg
2521 aagctccaag tcgccatcga cctgctgtcc accgaagccg ccctcgagct ggccggcaag
2581 gttgccgagt acgtcgacat catcgaactg ggcacccccc tgatcgaggc cgagggcctg
2641 tcggtcatca ccgccgtcaa gaaggctcac ccggacaaga tcgtcttcgc cgacatgaag
2701 accatggacg ccggcgagct cgaagccgac atcgcgttca aggccggcgc tgacctggtc
2761 acggtcctcg gctcggccga cgactccacc atcgcgggtg ccgtcaaggc cgcccaggct
2821 cacaacaagg gcgtcgtcgt cgacctgatc ggcatcgagg acaaggccac ccgtgcacag
2881 gaagttcgcg ccctgggtgc caagttcgtc gagatgcacg ctggtctgga cgagcaggcc
2941 aagcccggct tcgacctgaa cggtctgctc gccgccggcg agaaggctcg cgttccgttc
3001 tccgtggccg gtggcgtgaa agttgcgacc atccccgcag tccagaaggc cggcgcagaa
3061 gttgccgtcg ccggtggcgc catctacggt gcagccgacc cggccgccgc cgcgaaggaa
3121 ctgcgcgccg cgatcgcctg atcctgatcg                    Cleavage site
```

```
                                                          ↓
MASSVMSSAAVATRGNGAQASMVAPFTGLKSTASFPVSRKQNLDITSIASNGGRVSC  MKLQVAID
LLSTEAALELAGKVAEYVDIIELGTPLIEAEGLSVITAVKKAHPDKIVFADMKTMDAGELEADIAFKAGADL
VTVLGSADDSTIAGAVKAAQAHNKGVVVDLIGIEDKATRAQEVRALGAKFVEMHAGLDEQAKPGFDLNGLLA
AGEKARVPFSVAGGVKVATIPAVQKAGAEVAVAGGAIYGAADPAAAAKELRAAIA
```

FIG. 6

DNA sequence used for vector construction

Primer for amplification of rmpB gene by PCR

rmpB-sense (1825-1850) GCATGCAAGGGGTAACCATGACG

rmpB-antisense (2456-2435) TCTAGATCCGGGTCACTCGAG

Sequence of transit peptide **(accession:X05986)**

```
                                                                  atg
 301 gcttcttcag taatgtcctc agcagctgtt gccacccgcg gcaatggtgc acaagctagc
 361 atggttgcac ccttcactgg actcaagtcc accgcttctt tccctgtttc aaggaagcaa
 421 aaccttgaca ttacctccat tgctagcaac ggtggaagag tcagttgc
```

Sequence of rmpB gene **(accession: AB034913)**

```
                                                        atgacg caagccgcag
1861 aagccgacgg cgccgtgaag gtcgtcggag acgacatcac caacaacctt tcccttgttc
1921 gggacgaggt cgcggacacc gcggcgaaag tcgacccgga gcaggtggct gtcctcgctc
1981 gccaaatcgt ccagcctgga cgggttttcg tggcgggcgc cggtcgcagc gggctcgtcc
2041 tgcgcatggc cgccatgcgg ctgatgcact tcggcctcac cgtgcacgtc gcgggcgaca
2101 ccaccacccc ggcaatctca gccggcgatc tgctgctggt ggcttccggc tcgggcacca
2161 cctccggtgt ggtcaagtcc gccgagacgg ccaagaaggc cggggcgcgc atcgccgcct
2221 tcaccaccaa cccggattct ccgctggccg gtctggccga cgccgtggtg atcatccccg
2281 ccgcgcagaa gaccgatcac ggctcgcaca tttcgcggca gtacgccgga tccctttcg
2341 agcaggtgct gttcgtcgtc accgaagccg tgttccagtc gctgtgggat cacaccgagg
2401 tcgaggccga ggaactctgg acgcgccacg ccaactcga gtgacccgga cctcga
```

Cleavage site ↓

```
MASSVMSSAAVATRGNGAQASMVAPFTGLKSTASFPVSRKQNLDITSIASNGGRVSMTQAAEADGAVK
VVGDDITNNLSLVRDEVADTAAKVDPEQVAVLARQIVQPGRVFVAGAGRSGLVLRMAAMRLMHFGLTVH
VAGDTTTPAISAGDLLLVASGSGTTSGVVKSAETAKKAGARIAAFTTNPDSPLAGLADAVVIIPAAQKT
DHGSHISRQYAGSLFEQVLFVVTEAVFQSLWDHTEVEAEELWTRHANLE
```

FIG. 7

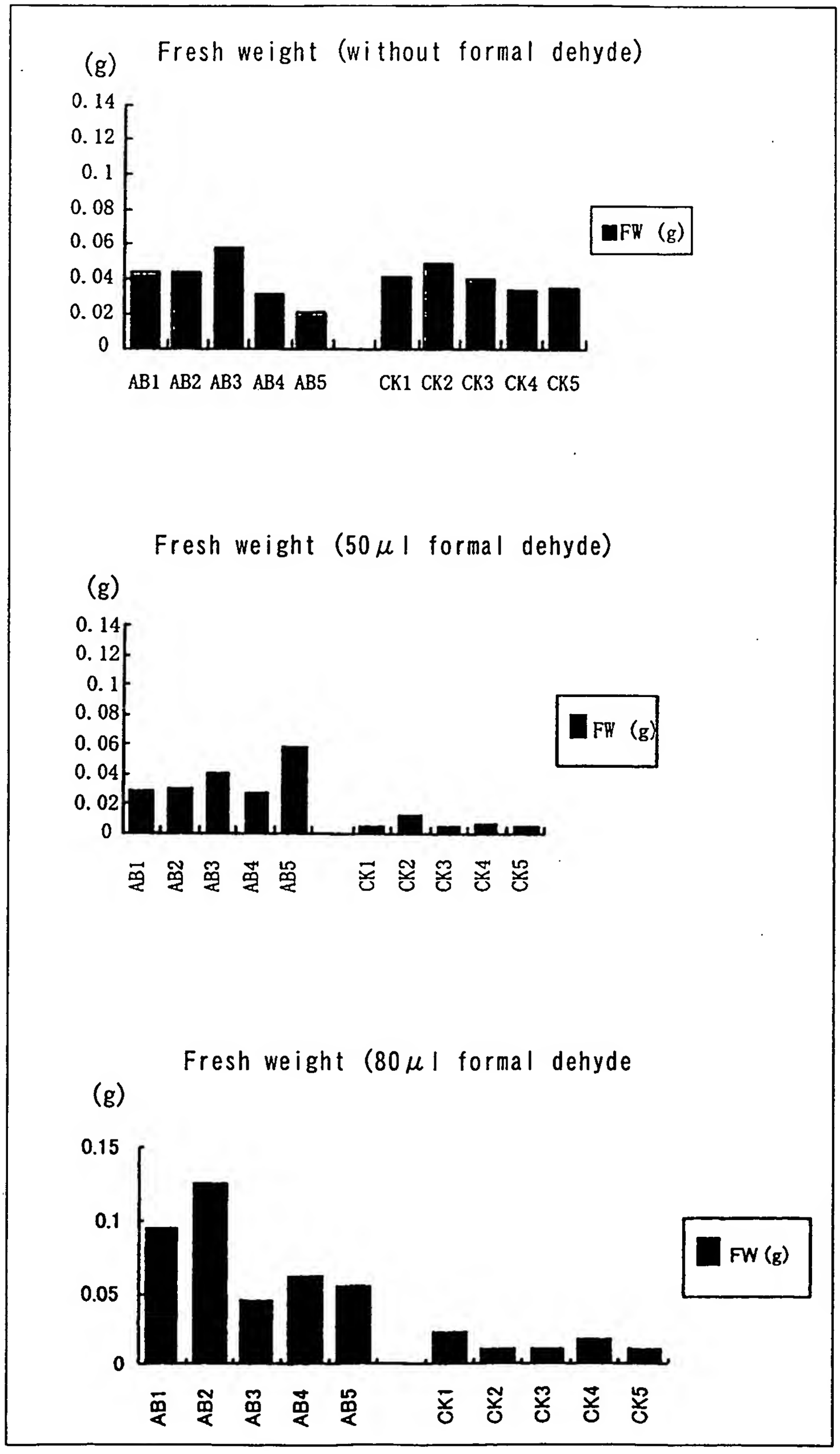
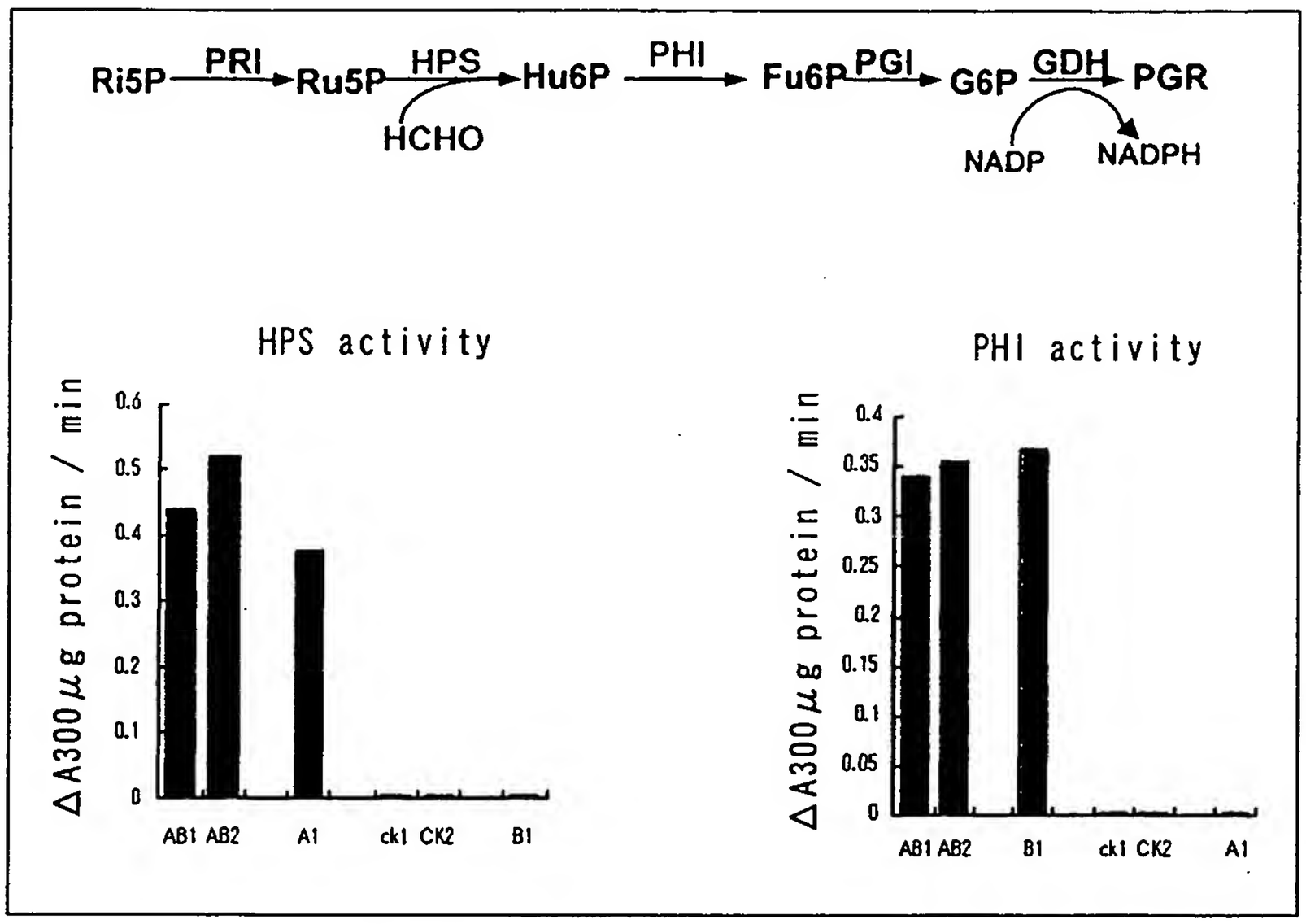

Fresh weight (without formal dehyde)
(g)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
FW (g)
AB1 AB2 AB3 AB4 AB5 CK1 CK2 CK3 CK4 CK5
Fresh weight (50μl formal dehyde)
(g)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
FW (g)
AB1 AB2 AB3 AB4 AB5 CK1 CK2 CK3 CK4 CK5
Fresh weight (80μl formal dehyde
(g)
0.15
0.1
0.05
0
FW (g)
AB1 AB2 AB3 AB4 AB5 CK1 CK2 CK3 CK4 CK5

FIG. 8


Ri5P
PRI
Ru5P
HPS
HCHO
Hu6P
PHI
Fu6P
PGI
G6P
GDH
PGR
NADP
NADPH
HPS activity
ΔA300 μg protein / min
0.6
0.5
0.4
0.3
0.2
0.1
0
AB1 AB2 A1 ck1 CK2 B1
PHI activity
ΔA300 μg protein / min
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
AB1 AB2 B1 ck1 CK2 A1

8/14

FIG. 9

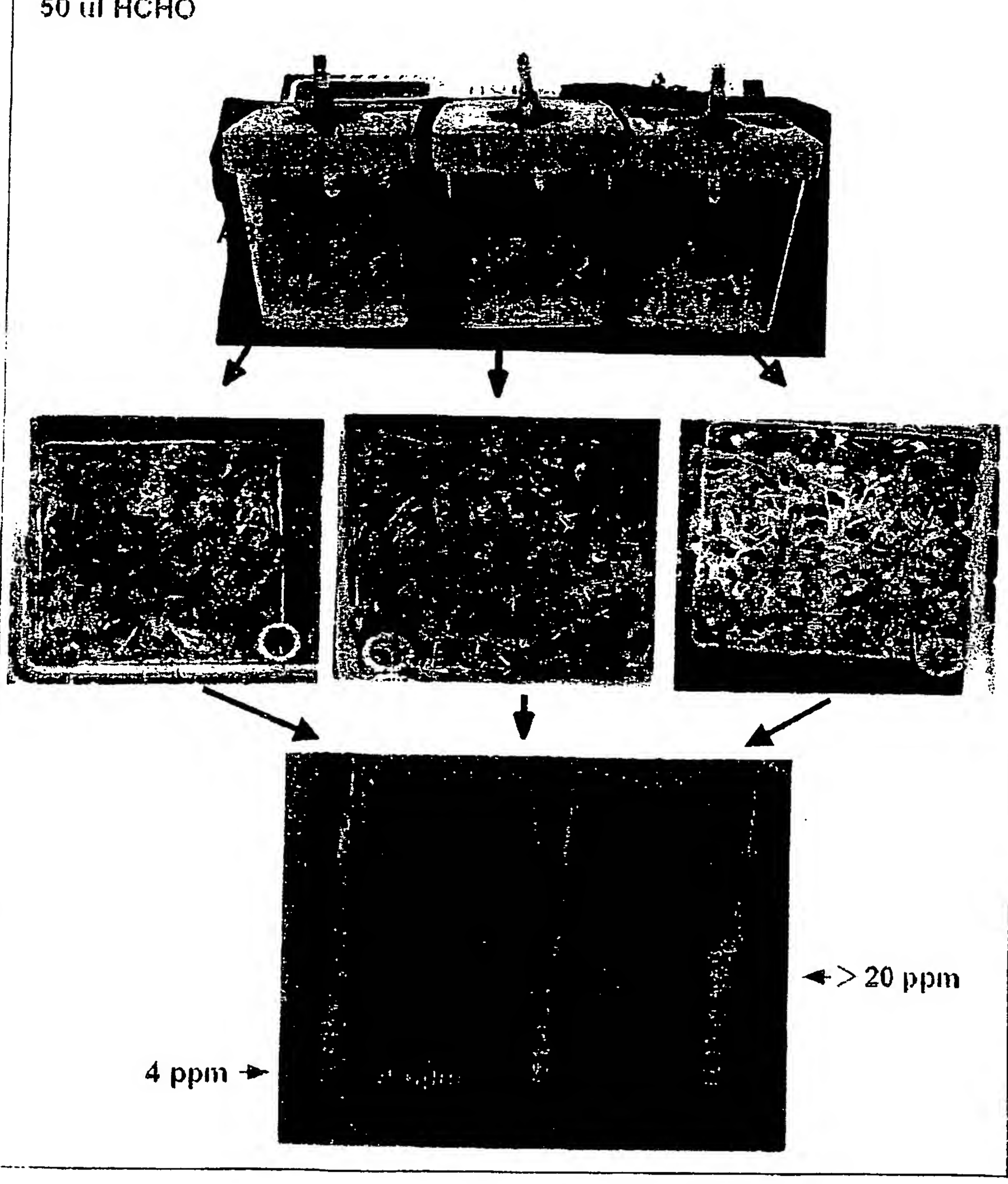


FIG. 10

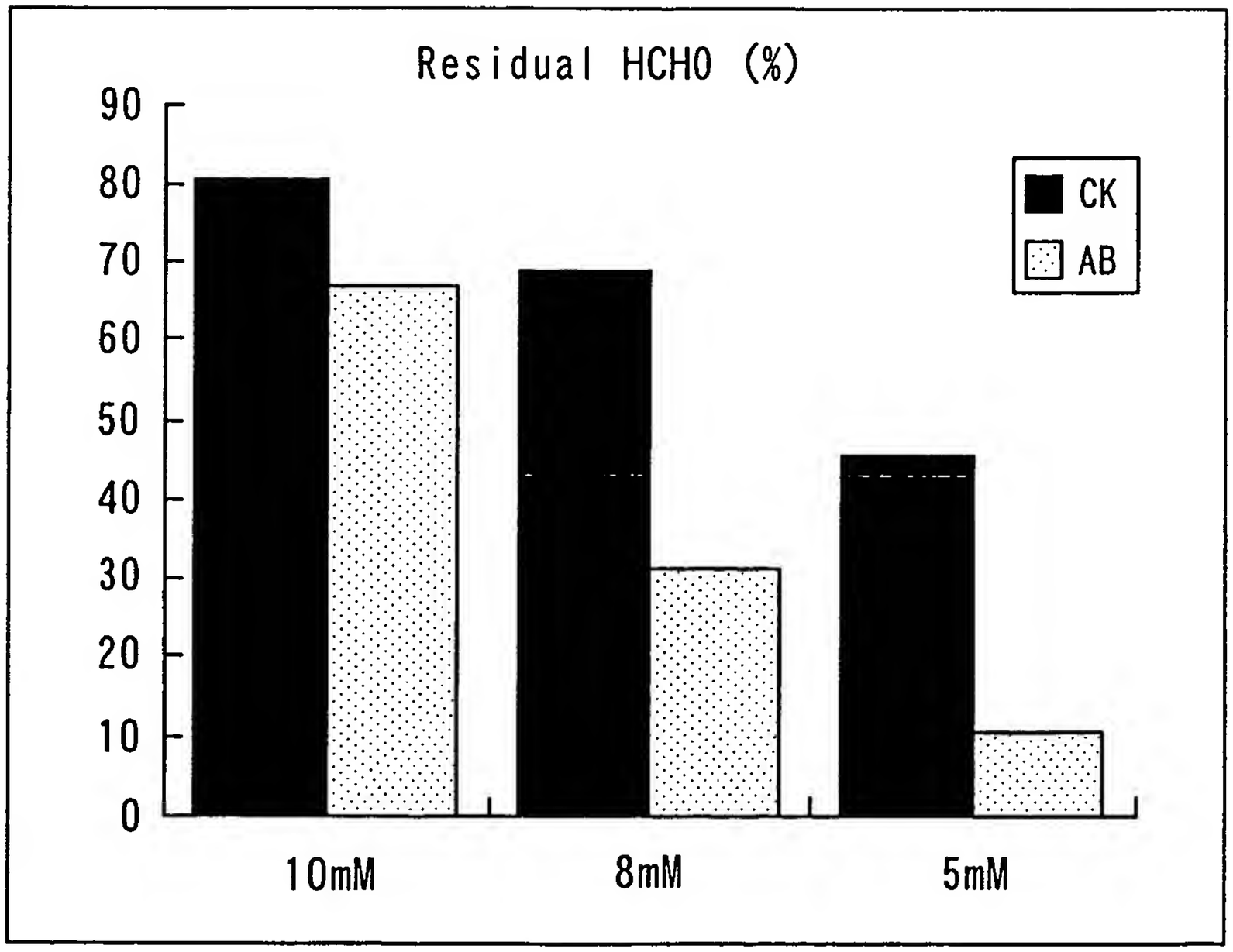


FIG. 11

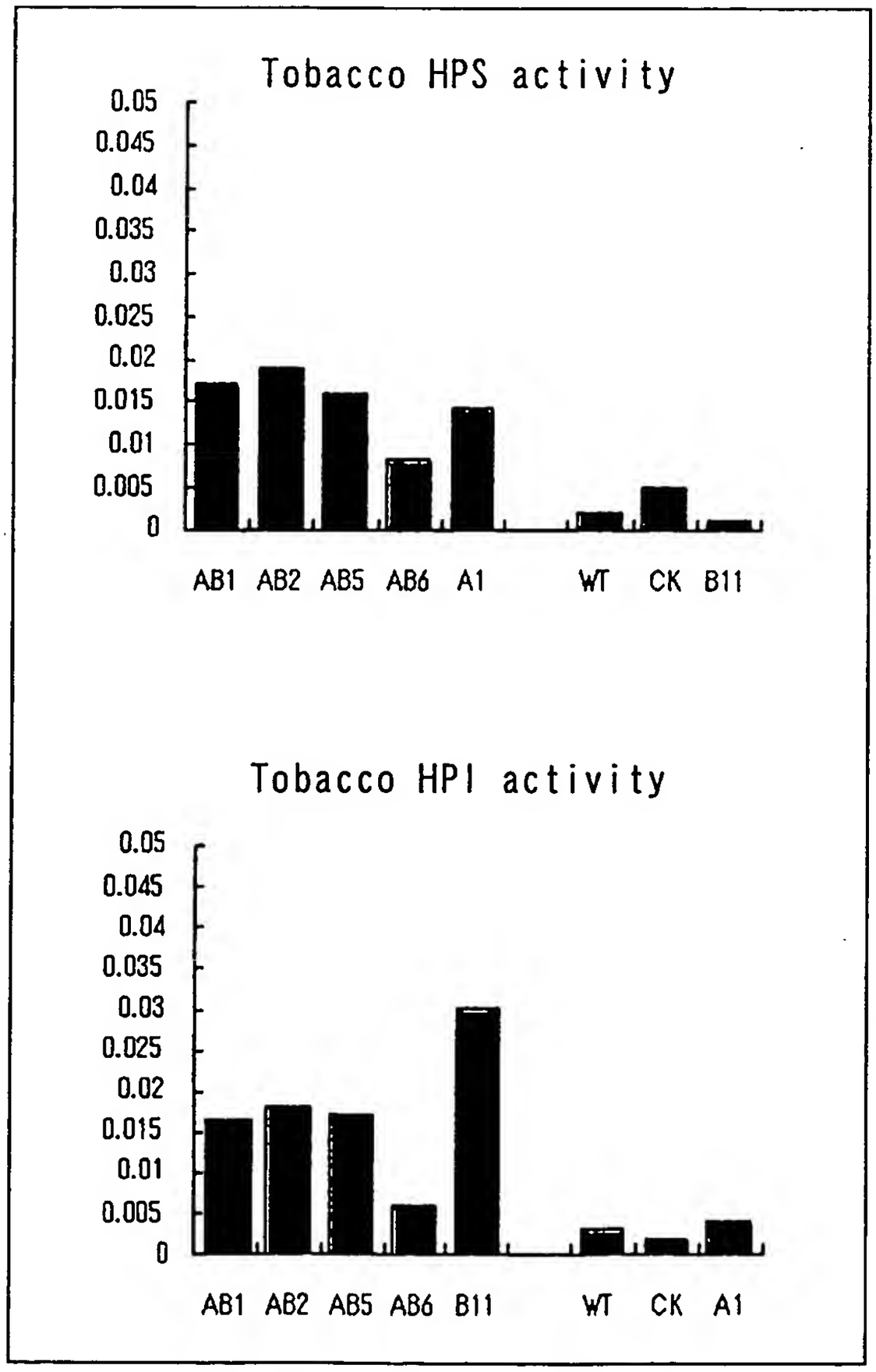

Tobacco HPS activity
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
AB1 AB2 AB5 AB6 A1 WT CK B11
Tobacco HPI activity
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
AB1 AB2 AB5 AB6 B11 WT CK A1

FIG. 12

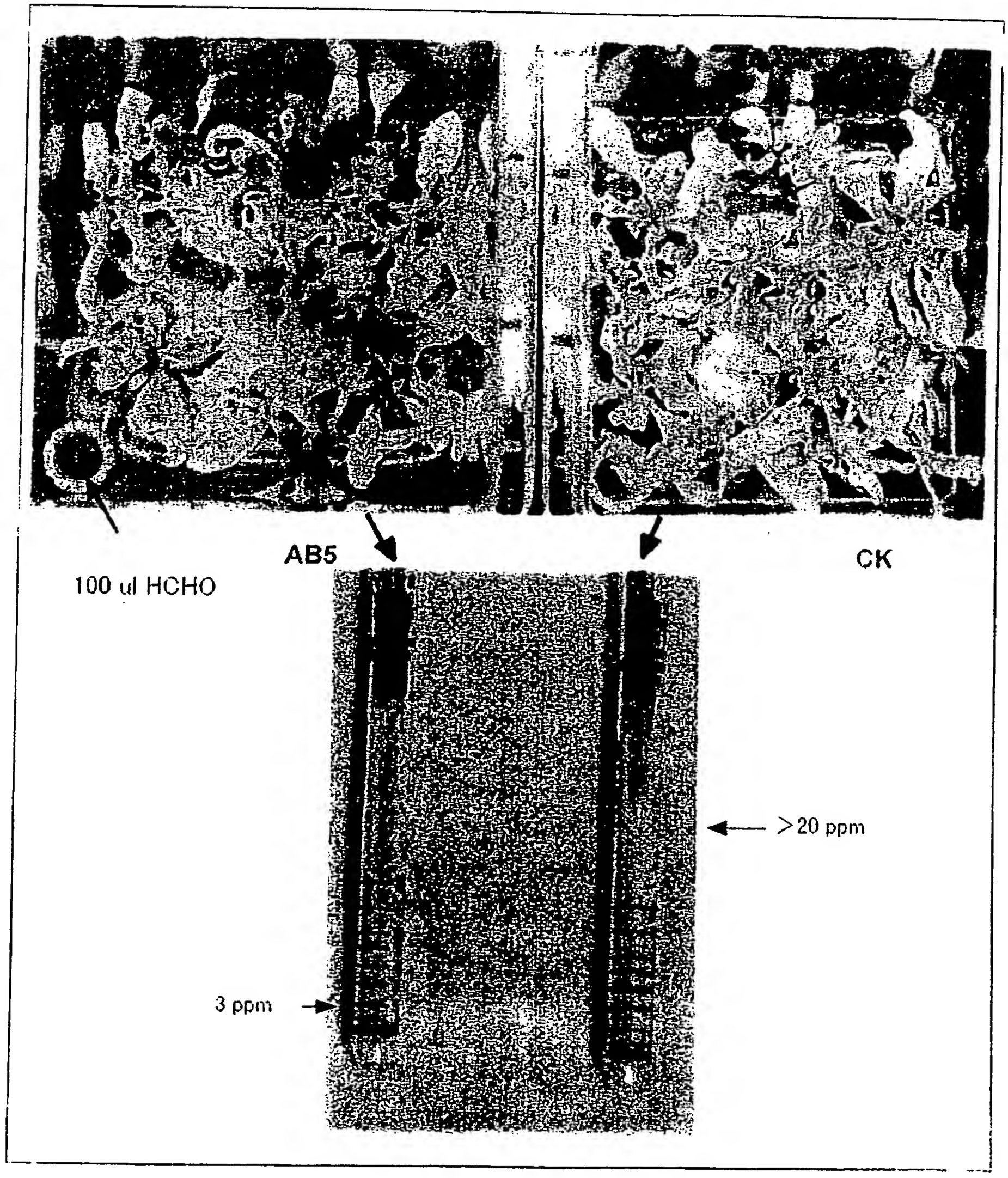


FIG. 13

FIG. 14

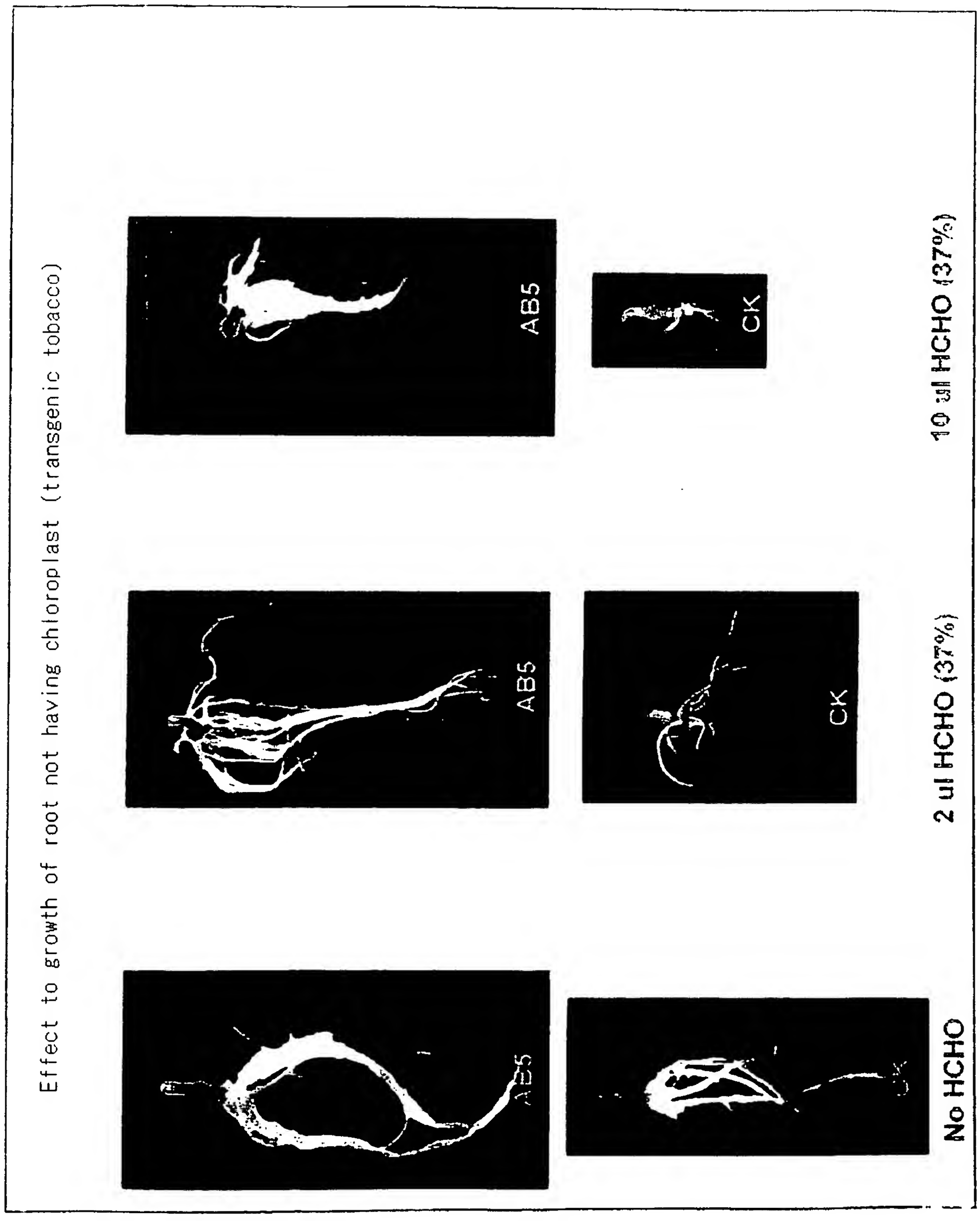

Effect to growth of root not having chloroplast (transgenic tobacco)
AB5
AB5
CK
CK
2 ul HCHO (37%)
10 ul HCHO (37%)
AB5
No HCHO

FIG. 15